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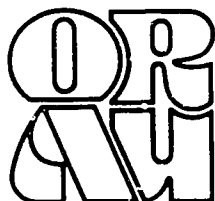
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ABSTRACT

Reported are data which describe the 1976 employment and educational characteristics of recent science and engineering graduates involved in energy-related activities. This information is from the 1976 National Survey of Recent Science and Engineering Graduates, a survey of about 9,800 persons who received bachelor's or master's degrees between 1973 and 1975. Major conclusions presented deal with race, sex, type of employer, salary, and field of study. Comparisons of recent graduates with experienced workers are also made. Contained in the appendix are the questionnaires used and some technical notes on the survey. (Author/WB)

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**ENERGY-RELATED
SCIENTISTS AND ENGINEERS:
STATISTICAL PROFILE
OF NEW ENTRANTS
INTO THE WORK FORCE, 1976**

Jane E. Rall

Manpower Research Programs

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Jane E. Rall
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October 1978

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Oak Ridge, Tennessee 37830

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ABSTRACT

This report presents data describing the 1976 employment and educational characteristics of recent science and engineering graduates involved in energy-related activities. Data are from the 1976 *National Survey of Recent Science and Engineering Graduates*, a survey of about 9800 persons who received bachelor's or master's degrees between 1973 and 1975.

Of the 724,000 persons represented by the survey, 33,000 indicated they were involved in energy-related work. Roughly one-third of these were scientists and two-thirds, engineers. The energy-related respondents were more apt to have received higher degrees than the total population of recent science and engineering graduates. Both females and nonwhites are under-represented in the energy-related group. The new energy-related workers are most often employed by private industry and report a higher median salary than do all recent graduates.

A comparison of the recent graduates with experienced workers indicates greater involvement in energy-related work by new engineers and less by new scientists than by their experienced counterparts. The percentage who are female of the new energy-related scientists and engineers is much higher than the percentage for the experienced energy-related group; this trend is not found for nonwhites.

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INTRODUCTION

This report presents data describing the 1976 employment and educational characteristics of recent college graduates from science and engineering programs. Section 1 compares data for the energy-related with all recent graduates who are new entrants into the work force. A recent study produced similar data for experienced scientists and engineers from a different survey.¹ Section 2 compares the data on energy-related scientists and engineers from the two surveys.

DATA

The data in Section 1 come from the *1976 National Survey of Recent Science and Engineering Graduates*, which was conducted by Westat, Inc. (Rockville, Maryland), for the National Science Foundation (NSF). Information was obtained from a sample of 9812 persons who earned bachelor's or master's degrees between July 1, 1973, and June 30, 1975. The reader should keep in mind that the survey of recent graduates does not include persons receiving doctorate degrees.

Section 2 compares the recent graduate data to data from the *1976 National Survey of Natural and Social Scientists and Engineers*, which was conducted by the Bureau of the Census for NSF. This is one in a series of surveys of a group of persons who were identified as scientists or engineers in the 1970 Census of Population. Thus, it does not include persons who were not in the labor force in 1970. The data presented here from the survey of experienced scientists and engineers have been restricted to persons whose highest degree is a bachelor's or master's (thus excluding persons with doctorates, "other," or no degree).

DEFINING THE ENERGY-RELATED SCIENTISTS AND ENGINEERS

In this report, *energy-related* is used to denote the subpopulation of scientists and engineers who indicated in the survey they devoted a significant portion of their professional time to the energy problem, one of several areas of critical national interest from which the respondents could choose.

¹Michael G. Finn and Jane E. Rall. *Energy-Related Scientists and Engineers: Statistical Profile from the NSF National Sample, 1976* (Oak Ridge, Tennessee: Oak Ridge Associated Universities) May 1978. ORAU-143.

(The actual question used in the new entrants survey is reproduced in Figure 1.)²

13. Listed below are selected topics of critical national interest. If you devoted a significant proportion of your professional time to any of these problem areas in the week of June 7, 1976, please check the box for the one on which you spent the MOST time.

Education:	
Teaching.	1 <input type="checkbox"/>
Other	2 <input type="checkbox"/>
Health.	3 <input type="checkbox"/>
Defense	4 <input type="checkbox"/>
Environmental protection, pollution control	
Space	5 <input type="checkbox"/>
Crime prevention and control.	6 <input type="checkbox"/>
Food production and technology.	7 <input type="checkbox"/>
Energy and fuel	8 <input type="checkbox"/>
Other mineral resources	9 <input type="checkbox"/>
Community development and services.	10 <input type="checkbox"/>
Housing (planning, design, construction).	11 <input type="checkbox"/>
Transportation.	12 <input type="checkbox"/>
Other (Specify):	13 <input type="checkbox"/>
None of the above	14 <input type="checkbox"/>

Source: Westat, Inc./NSF, 1976 *National Survey of Recent Science and Engineering Graduates*.

Figure 1. Question Used To Identify Energy-Related Scientists and Engineers

Note that the question permits respondents to select only one of the topics mentioned. Therefore, some of the persons working on the health or environmental effects of energy production can be expected to have chosen "health" or "environmental protection, pollution control" instead of "energy and fuel." Thus, what results from a tabulation of persons who selected "energy and fuel" might be described as a core group of energy-related manpower.

It should also be noted that the question on the 1976 *National Survey of Natural and Social Scientists and Engineers* differed slightly from the one above. It did not include the choices of "transportation" or "other," nor did it restrict the respondent to considering his time during a specific reference week. Thus, those responding to the new entrants survey may be under-represented for comparison purposes.

²For convenience, the term *new entrant* is used to refer to those who received bachelor's or master's degrees between 1973 and 1975. However, some may have joined the labor force earlier and completed their degree while working.

Data on the new entrants were gathered from a questionnaire mailed to recent graduates (Appendix A) and from telephone interviews. Since the question used to determine energy-relatedness (Figure 1) was not asked in the telephone survey, the data have been adjusted to more accurately reflect the actual situation.³ Further information on sample size can be found in Appendix B.

The reader should also be aware of the fact that the respondents to the 1976 *National Survey of Recent Science and Engineering Graduates* were given one list from which to choose both their degree and employment specialty. Respondents to the survey of experienced scientists and engineers had separate lists from which to choose their major field of study and occupational categories, and each separate list differed slightly from the single list used by the new entrants to the work force (Appendix C shows a copy of the Bureau of the Census questionnaire). Both college major and occupational field categories from the two surveys were matched as closely as possible and aggregated into the groups that appear in this report (see Appendix B for more details).

³It was assumed that the telephone survey respondents in a given field would display similar characteristics to those answering the mailed survey. Thus, the frequency counts for the energy-related in each college major and occupational field were multiplied by the ratio of the number of total respondents to the number of mail-survey respondents for that field.

SECTION 1 — NEW ENERGY-RELATED SCIENTISTS AND ENGINEERS IN
THE WORK FORCE IN 1976

The new entrants into the work force can be classified as scientists or engineers either by their major field of study for the highest degree held or by their current employment specialty. Throughout this section, data will usually be presented for both definitions (major field and employment specialty) of scientists and engineers, although where it is deemed more appropriate, only one characterization is used.

MAJOR FIELD OF STUDY VERSUS OCCUPATION

Of the 724,000 persons represented by the *1976 National Survey of Recent Science and Engineering Graduates*, 4.6% indicated they devoted a significant portion of their professional time to energy-related work during the reference week of June 7, 1976. Of those whose college major was engineering, 17.5% indicated an involvement in energy-related activities while only 1.8% of the science majors indicated this was the case (Table 1). Environmental science majors were the only science majors to be significantly involved in energy-related activities.

Looking at the percentage who are energy-related in each occupational category, one can see that almost one-third of the recent graduates working as mechanical or chemical engineers and over one-quarter of those working as environmental scientists are doing energy-related work (Table 2).¹

Table 3 compares the major field of study with the current occupation of the respondents. In general, engineers are more likely than scientists to be working in the same field as their college major. This trend also holds true for the energy-related engineers and scientists. However, the data in Table 3 also indicate that the new energy-related scientists and engineers are more likely to have an occupation in the same field as their college major (79.9%) than are the total population of new scientists and engineers (48.9%).

EDUCATIONAL ATTAINMENT

Tables 4 and 5 show that recent graduates devoting a significant portion of their professional time to the energy problem are more apt to have received higher degrees than the total population of recent science and engineering graduates. Roughly 20% of all new entrants into the work force have a master's

¹The reader should note that all of the recent graduates who indicated they devoted a significant portion of their time to energy and fuel were working either full-time or part-time during the reference week.

or higher degree; while 33% of those involved in energy-related work have master's degrees. It can be noted that it is primarily the energy-related scientists that account for the higher educational attainment of the energy-related population. While only 17.8% of the recent science majors have received a master's or higher degree, 34.0% of the science majors involved in energy-related activities have master's degrees.

The same trend is apparent when looking at persons who are working as scientists. Here 40.2% of the energy-related scientists have a master's or higher degree as opposed to 31.8% of all new scientists.

SEX

Data on the sex of recent graduates are presented in Table 6. Females account for 29.1% of the new science and engineering majors but only 8.3% of the energy-related science and engineering majors. Females are also under-represented in energy-related activities when scientists and engineers are classified by occupation (6.7% of the energy-related versus 19.3% of all scientists and engineers). However, if one considers just the new engineers, the percentage who are female is roughly the same or higher for the energy-related as for the entire population of recent graduates.

RACE

Table 7 shows that the percentage of energy-related scientists and engineers who are nonwhite is significantly lower than the percentage for all new scientists and engineers. While 6.5% of the recent graduates working as engineers are nonwhite, only 2.3% of the energy-related engineers are nonwhite; and while 5.6% of those working as scientists are nonwhite, only 1.7% of the energy-related scientists are.

TYPE OF EMPLOYER

Most of the new engineers and a sizable number of new scientists are employed by private industry. However, among the energy-related, even larger proportions of engineers and scientists are employed by private industry: 81.4% of engineers and 65.6% of scientists (Table 8). Educational institutions employ the next largest percentage of the new energy-related engineers (7.4%) and scientists (21.4%). Because of the concentrations of the energy-related scientists and engineers working for these two types of employers, the percentage of energy-related scientists and engineers working for the government or nonprofit organizations is generally much lower than the percentage for all new scientists and engineers.

PRIMARY WORK ACTIVITY

Percentage distributions of the new scientists and engineers by primary work activity are presented in Table 9. The energy-related are more likely to be involved in applied research, design, and production activities and less likely to be involved in management and teaching than the total population of new entrants into the work force. This is not surprising when one considers that the new energy-related workers are primarily engineers and design and production activities are more common to engineers than to scientists.

EARNINGS

The median annual salary for the new energy-related scientists and engineers employed full-time in 1976 was \$15,000 (Table 10). This is about 36% higher than the median salary of all recent graduates who were working full-time during the reference week of June 7, 1976. Energy-related engineers reported salaries 6% higher than all new engineers, and energy-related scientists had salaries approximately 20% higher than all new scientists. The highest salaries reported by the energy-related group came from chemical and civil engineers; of the energy-related scientists, the environmental scientists reported the highest median salary. The fields with the higher median salaries tend to be the fields that also have a higher percentage of energy-related workers. The greatest differences in median salaries between the total and energy-related groups are found for the environmental scientists (18% by occupation, 34% by college major) and civil engineers (16% by occupation, 15% by college major).

The salary differences between the total and energy-related groups are more pronounced for recent graduates with bachelor's degrees than those with master's degrees (Tables 11 and 12). Energy-related engineers with bachelor's degrees had a median salary approximately 8% higher than all engineers with bachelor's degrees; energy-related scientists with bachelor's degrees had a median salary approximately 20% higher than all scientists with the same educational attainment. In contrast, for those whose highest degree held was a master's degree, median salaries for energy-related engineers were virtually the same as for all engineers, while median salaries for scientists were between 10% and 20% higher for the energy-related.

Table 1. Major Field of Study for Highest Degree Held,
Total Versus Energy-Related New Entrants

<u>Major</u>	<u>Total</u> ¹	<u>Energy- Related</u>	<u>Percentage Energy- Related</u>
Engineering	129,582	22,651	17.5%
Chemical	10,312	2,396	23.2
Civil	20,572	3,411	16.6
Electrical or Electronic	32,693	4,682	14.3
Mechanical	21,454	5,266	24.5
Other	44,551	6,896	15.5
Science	580,205	10,455	1.8
Physical	43,546	1,854	4.3
Environmental	10,574	1,775	16.8
Other	526,085	6,826	1.3
Other	13,965	54	.4
Not Reported	-	-	
Total	<u>723,752</u>	<u>33,160</u>	4.6

Source: Westat, Inc./NSF, 1976 *National Survey of Recent Science and Engineering Graduates*.

¹Due to fractional weights, some frequencies may be in error by as much as 212.

Table 2. Occupation,
Total Versus Energy-Related New Entrants

<u>Occupation</u>	<u>Total¹</u>	<u>Energy- Related</u>	<u>Percentage Energy- Related</u>
Engineer	110,825	23,296	21.0%
Chemical	8,657	2,508	29.0
Civil	14,559	2,485	17.1
Electrical or Electronic	25,002	4,631	18.5
Mechanical	14,879	4,678	31.4
Other	47,728	8,994	18.8
Scientist	179,146	6,051	3.4
Physical	18,342	1,200	6.5
Environmental	6,627	1,761	26.6
Other	154,177	3,090	2.0
Other	267,193	3,733	1.4
Not Reported	166,608	200	.1
Total	<u>723,772</u>	<u>33,280</u>	4.6

Source: Westat, Inc./NSF, 1976 *National Survey of Recent Science and Engineering Graduates*.

¹Due to fractional weights, some frequencies may be in error by as much as 212.

Table 3. Comparison of Major Field of Study for Highest Degree Held
and Occupation, Total Versus Energy-Related New Entrants

<u>Major</u>	<u>Total (Thousands)</u>	<u>Percentage with Occupation Same as College Major</u>
Science and Engineering		
Total	710	48.9%
Energy-Related	33	79.9
Engineering		
Total	130	81.1
Energy-Related	23	91.1
Science		
Total	580	40.0
Energy-Related	10	55.5

Source: Westat, Inc./NSF, 1976 *National Survey of Recent Science and Engineering Graduates*.

NOTE: For the purposes of this table, a person whose major field of study for the highest degree held is any area of engineering (science) is considered to have an occupation the same as his college major if his current employment is in any type of engineering (science).

Table 4. Educational Attainment by Major Field of Study for Highest Degree Held,
Total Versus Energy-Related New Entrants

<u>Major</u>	<u>Total</u>			<u>Energy-Related</u>		
	<u>Bachelor's</u>	<u>Master's</u>	<u>Doctorate</u>	<u>Bachelor's</u>	<u>Master's</u>	<u>Doctorate</u>
Engineering	68.9%	30.1%	1.0%	66.1%	33.2%	0.6%
Chemical	74.3	22.6	3.2	62.6	37.4	0
Civil	66.6	33.4	0	59.9	40.1	0
Electrical or Electronic	70.3	28.7	1.0	69.5	30.5	0
Mechanical	79.5	19.2	1.3	78.7	21.3	0
Other	62.5	36.7	.7	58.6	39.3	2.0
Science	82.1	16.8	1.0	66.0	34.0	0
Physical	74.4	24.6	1.0	62.6	37.4	0
Environmental	70.0	30.0	0	52.1	47.9	0
Other	83.0	15.9	1.1	70.5	29.5	0
Other	0	90.3	9.7	0	100.0	0
Total	78.2	20.6	1.2	66.0	33.6	.4

Source: Westat, Inc./NSF, 1976 National Survey of Recent Science and Engineering Graduates.

Table 5. Educational Attainment by Occupation,
Total Versus Energy-Related New Entrants

Occupation	Total			Energy-Related		
	Bachelor's	Master's	Doctorate	Bachelor's	Master's	Doctorate
Engineer	68.8%	30.5%	0.7%	65.6%	33.8%	0.6%
Chemical	71.5	26.5	2.0	59.1	40.9	0
Civil	64.2	35.8	0	60.5	39.5	0
Electrical or Electronic	66.3	32.4	1.3	63.3	36.7	0
Mechanical	80.2	19.0	.7	81.8	18.2	0
Other	67.4	32.1	.5	61.5	36.9	1.6
Scientist	68.2	29.3	2.5	59.8	40.2	0
Physical	73.8	24.9	1.4	62.7	37.3	0
Environmental	61.5	38.5	0	45.5	54.5	0
Other	67.8	29.4	2.7	66.8	33.2	0
Other	88.6	11.0	.4	80.1	19.9	0
Total	78.1	20.8	1.2	66.2	33.4	.4

Source: Westat, Inc./NSF, 1976 National Survey of Recent Science and Engineering Graduates.

Table 6. Percentage Female,
Total Versus Energy-Related New Entrants

	<u>Total</u>	<u>Energy-Related</u>
Major		
Science and Engineering	29.1%	8.3%
Engineering	2.5	3.1
Science	35.0	19.5
Occupation		
Scientists and Engineers	19.3	6.7
Engineers	3.4	3.7
Scientists	29.1	18.3

Source: Westat, Inc./NSF, 1976 *National Survey of Recent Science and Engineering Graduates*.

Table 7. Percentage Nonwhite,
Total Versus Energy-Related New Entrants

	<u>Total</u>	<u>Energy-Related</u>
Major		
Science and Engineering	6.5%	2.4%
Engineering	6.8	3.1
Science	6.4	1.0
Occupation		
Scientists and Engineers	6.0	2.2
Engineers	6.5	2.3
Scientists	5.6	1.7

Source: Westat, Inc./NSF, 1976 *National Survey of Recent Science and Engineering Graduates*.

Table 8. Type of Employer by Occupation,
Total Versus Energy-Related New Entrants

<u>Type of Employer</u>	<u>All Scientists and Engineers</u>		<u>Engineers</u>		<u>Scientists</u>	
	<u>Total</u>	<u>Energy-Related</u>	<u>Total</u>	<u>Energy-Related</u>	<u>Total</u>	<u>Energy-Related</u>
Educational Institution	20.4%	10.3%	7.0%	7.4%	28.8%	21.4%
Nonprofit Organization	10.0	2.2	1.3	1.5	15.4	4.7
Federal Government	10.6	5.7	12.3	5.6	9.5	6.5
State and Local Government	11.1	2.1	5.3	2.1	14.8	1.9
Private Industry	46.1	78.1	73.2	81.4	29.2	65.6
Other	1.8	1.6	.9	2.0	2.3	0

Source: Westat, Inc./NSF, *1976 National Survey of Recent Science and Engineering Graduates*.

Table 9. Primary Work Activity by Occupation,
Total Versus Energy-Related New Entrants

<u>Primary Work Activity</u>	<u>All Scientists and Engineers</u>		<u>Engineers</u>		<u>Scientists</u>	
	<u>Total</u>	<u>Energy- Related</u>	<u>Total</u>	<u>Energy- Related</u>	<u>Total</u>	<u>Energy- Related</u>
Management or						
Administration	12.5%	8.8%	13.9%	9.2%	11.5%	7.4%
Basic Research	11.1	6.6	3.8	4.9	15.7	13.6
Applied Research	9.1	14.1	8.1	11.6	9.7	23.4
Development	10.8	10.9	14.5	10.3	8.5	13.2
Design	9.8	19.8	22.7	24.6	1.8	.8
Teaching	6.8	1.1	2.1	.4	9.8	4.1
Report and Technical						
Writing	2.0	1.6	1.3	.8	2.4	4.6
Production	6.3	12.1	9.7	13.9	4.1	5.2
Consulting	3.9	5.8	4.2	6.2	3.6	4.6
Quality Control,						
Inspection, Testing	6.1	6.8	7.4	6.2	5.4	9.0
Sales, Marketing,						
Purchasing, Estimating	2.0	1.9	2.8	2.0	1.6	1.5
Other	19.5	10.6	9.5	10.0	25.8	12.7

Source: Westat, Inc./NSF, 1976 *National Survey of Recent Science and Engineering Graduates*.

Table 10. Median Salary,
Total Versus Energy-Related New Entrants

<u>Field</u>	<u>Occupation</u>			<u>Major</u>		
	<u>Total</u>	<u>Energy-Related</u>	<u>Ratio of Energy-Related to Total</u>	<u>Total</u>	<u>Energy-Related</u>	<u>Ratio of Energy-Related to Total</u>
Engineer	\$15,000	\$15,900	1.06	\$15,000	\$15,900	1.06
Chemical	16,200	16,900	1.04	16,200	16,800	1.04
Civil	14,000	16,200	1.16	14,000	16,100	1.15
Electrical or Electronic	15,000	15,900	1.06	14,700	15,000	1.02
Mechanical	14,500	15,000	1.03	14,500	15,800	1.09
Other	15,000	15,600	1.04	15,000	15,600	1.04
Scientist	11,000	13,000	1.18	10,000	12,000	1.20
Physical	11,100	10,400	.94	11,000	12,000	1.09
Environmental	13,000	15,400	1.18	11,500	15,400	1.34
Other	10,800	12,600	1.17	10,000	11,300	1.13
Other	9,600	10,400	1.08	12,000	12,000	1.00
Total	11,000	15,000	1.36	11,000	15,000	1.36

Source: Westat, Inc./NSF, 1976 *National Survey of Recent Science and Engineering Graduates*.

NOTE: All figures have been rounded to the nearest hundred. Salaries for respondents academically employed for 9 to 10 months have been adjusted by a factor of 11/9.

Table 11. Median Salary for Highest Degree: Bachelor's,
Total Versus Energy-Related New Entrants

Field	Occupation			Major		
	Total	Energy-Related	Ratio of Energy-Related to Total	Total	Energy-Related	Ratio of Energy-Related to Total
Engineer	\$14,000	\$15,000	1.07	\$14,000	\$15,200	1.09
Chemical	15,600	16,800	1.08	15,800	16,800	1.06
Civil	13,400	15,000	1.12	13,500	14,900	1.10
Electrical and Electronic	14,200	15,000	1.06	14,000	14,900	1.06
Mechanical	14,300	14,500	1.01	14,400	15,500	1.08
Other	14,000	15,200	1.09	14,000	15,500	1.11
Scientist	10,000	12,000	1.20	9,600	11,300	1.18
Physical	10,400	10,700	1.03	10,000	11,400	1.14
Environmental	11,000	13,800	1.25	10,500	14,000	1.33
Other	10,000	12,800	1.28	9,500	11,000	1.16
Other	9,300	10,100	1.09	-	-	-
Total	10,000	14,400	1.44	10,000	14,400	1.44

Source: Westat, Inc./NSF, 1976 National Survey of Recent Science and Engineering Graduates.

NOTE: All figures have been rounded to the nearest hundred. Salaries for respondents academically employed for 9 to 10 months have been adjusted by a factor of 11/9.

Table 12. Median Salary for Highest Degree: Master's,
Total Versus Energy-Related New Entrants

<u>Field</u>	<u>Occupation</u>			<u>Major</u>		
	<u>Total</u>	<u>Energy-Related</u>	<u>Ratio of Energy-Related to Total</u>	<u>Total</u>	<u>Energy-Related</u>	<u>Ratio of Energy-Related to Total</u>
Engineer	\$16,800	\$17,000	1.01	\$16,800	\$16,900	1.01
Chemical	16,800	17,500	1.04	16,800	16,800	1.00
Civil	15,200	17,400	1.14	15,800	17,400	1.10
Electrical or Electronic	18,000	17,000	.94	17,000	15,800	.93
Mechanical	17,400	18,500	1.06	17,000	18,500	1.09
Other	16,800	16,100	.96	16,700	16,000	.96
Scientist	13,400	14,700	1.10	13,400	15,900	1.19
Physical	13,500	-	-	14,000	14,000	1.00
Environmental	16,000	16,000	1.00	15,000	17,700	1.18
Other	13,200	12,000	.91	13,200	15,900	1.20
Other	13,000	11,800	.91	11,700	12,000	1.03
Total	13,500	16,500	1.22	13,500	16,500	1.22

Source: Westat, Inc./NSF, 1976 National Survey of Recent Science and Engineering Graduates.

NOTE: All figures have been rounded to the nearest hundred. Salaries for respondents academically employed for 9 to 10 months have been adjusted by a factor of 11/9.

SECTION 2 — ENERGY-RELATED SCIENTISTS AND ENGINEERS IN 1976:
A COMPARISON OF NEW ENTRANTS WITH THE EXPERIENCED WORK FORCE

OCCUPATION AND COLLEGE MAJOR

Table 13 presents a comparison of the percentage who are energy-related for the new entrants and experienced work force by college major and occupational field. It appears that the new entrants who majored in engineering are more apt to be involved in energy-related activities than the experienced population of engineering majors. Differences are most noticeable among the civil engineers (16.6% of new entrants, 8.1% of experienced work force) and mechanical engineers (24.5% of new entrants, 16.5% of experienced workers).

The data indicate that the percentage of new scientists going into energy-related work is much lower than the percentage of experienced energy-related scientists. Whereas almost one-half (48.9%) of the experienced environmental scientists are involved in energy-related work, only about one-quarter (26.6%) of the new entrants working as environmental scientists are energy-related.

One might also note from the data in Table 13 that the percentage of new entrants who are energy-related (4.6%) is much lower than the percentage of experienced scientists and engineers who are energy-related (12.0%). This is due, in part, to the fact that a larger proportion of the experienced work force is engineers (roughly 65%) while the majority of the new entrants are scientists (approximately 80%).

In comparing the college major with occupation of the energy-related scientists and engineers, one notes that a larger percentage of the new engineering majors than the experienced engineering majors have an occupation in engineering, while a smaller percentage of the new science majors than the experienced science majors are working as scientists (Table 14).

EDUCATIONAL ATTAINMENT

Table 15 compares the educational attainment of the new entrants with experienced scientists and engineers who are involved in energy-related activities. As is true throughout this report, our attention is restricted to those scientists and engineers whose highest degree is a bachelor's or master's.

Proportionately more of the new entrants involved in energy-related work hold master's degrees (33.4%) than do the experienced scientists and

engineers (27.3%). Most of the difference can be attributed to the engineers, as 33.8% of the new entrants and only 26.0% of the experienced hold master's degrees. Only the new mechanical engineers have a lower percentage of master's degree holders than the experienced.

Of the scientists, on the other hand, only the new environmental scientists show a higher proportion of master's degree holders (54.5%) than their experienced counterparts (37.2%)

SEX AND RACE

A much greater percentage of the new energy-related scientists and engineers are female (6.7% by occupation) than of the experienced energy-related group (1.0%), as shown in Table 16.

In contrast, Table 17 indicates the percentage of the new energy-related scientists and engineers who are nonwhite is lower (2.2% by occupation) than the percentage of nonwhite experienced scientists and engineers (3.3%).

TYPE OF EMPLOYER

A comparison of the energy-related new entrants with experienced scientists and engineers by type of employer is provided in Table 18. The energy-related new entrants are more likely to work at educational institutions (10.3%) than are their experienced counterparts (2.4%); otherwise, their distributions are quite similar.

PRIMARY WORK ACTIVITY

It is not surprising to find that the experienced scientists and engineers are more often involved in management activities than are the energy-related new entrants (Table 19). The experienced workers are also more involved in consulting activities. A larger percentage of the new entrants than the experienced are found in basic and applied research and quality control activities.

EARNINGS

Median annual salaries of the new and experienced scientists and engineers who were working full-time are compared in Table 20. As expected, the salaries of the experienced workers are higher than those of the new entrants.

However, more insight may be gained by looking at the ratio of the energy-related to total population salaries for the two groups. Salaries for both new and experienced energy-related engineers are 6% higher than those for all engineers. The effect on median salaries of being involved in

energy-related activities is most pronounced for new civil engineers (16%) and experienced chemical engineers (10%).

Overall, both new and experienced energy-related scientists earn higher salaries (18% and 20%, respectively) than does the total population of scientists. However, the new energy-related physical scientists earn less than the population of new physical scientists as a whole while the experienced energy-related physical scientists earn more than the total experienced group. In contrast, the effect of being involved in energy-related activities is more favorable for the new environmental scientists (18% higher salaries) than it is for their experienced counterparts (8%).

Table 13. Percentage Energy-Related,
New Entrants Versus Experienced Workers

<u>Field</u>	<u>Major</u>		<u>Occupation</u>	
	<u>New Entrants</u>	<u>Experienced</u>	<u>New Entrants</u>	<u>Experienced</u>
Engineer	17.5%	13.6%	21.0%	14.3%
Chemical	23.2	21.5	29.0	23.7
Civil	16.6	8.1	17.1	7.5
Electrical or Electronic	14.3	11.3	18.5	12.0
Mechanical	24.5	16.5	31.4	18.8
Other	15.5	14.4	18.8	14.6
Scientist	1.8	8.6	3.4	8.9
Physical	4.3	8.4	6.5	7.4
Environmental	16.8	44.6	26.6	48.9
Other	1.3	3.3	2.0	3.4
Other or No Response	.4	8.9	1.5	9.4
Total	4.6	12.0	4.6	12.0

Source: Westat, Inc./NSF, 1976 *National Survey of Recent Science and Engineering Graduates*, and U. S. Bureau of Census/NSF, 1976 *National Survey of Natural and Social Scientists and Engineers*.

Table 14. Comparison of Major Field of Study for Highest
Degree Held and Occupation,
Energy-Related New Entrants Versus Energy-Related Experienced Workers

<u>Major</u>	<u>Percentage with Occupation Same as College Major</u>	
	<u>New Entrants</u>	<u>Experienced</u>
Science and Engineering	79.9%	74.3%
Engineering	91.1	76.7
Science	55.5	64.7

Source: Westat, Inc./NSF, *1976 National Survey of Recent Science and Engineering Graduates*, and U. S. Bureau of Census/NSF, *1976 National Survey of Natural and Social Scientists and Engineers*.

NOTE: For the purposes of this table, a person whose major field of study for the highest degree held is any area of engineering (science) is considered to have an occupation the same as his college major if his current employment is in any type of engineering (science).

Table 15. Educational Attainment by Occupation,
Energy-Related New Entrants Versus Energy-Related Experienced Workers

<u>Occupation</u>	<u>New Entrants</u>		<u>Experienced</u>	
	<u>Bachelor's</u>	<u>Master's</u>	<u>Bachelor's</u>	<u>Master's</u>
Engineer	65.6%	33.8%	74.0%	26.0%
Chemical	59.1	40.9	64.6	35.4
Civil	60.5	39.5	69.0	31.0
Electrical or Electronic	63.3	36.7	77.3	22.7
Mechanical	81.8	18.2	76.6	23.4
Other	61.5	36.9	73.6	26.4
Scientist	59.8	40.2	60.5	39.5
Physical	62.7	37.3	58.7	41.3
Environmental	45.5	54.5	62.8	37.2
Other	66.8	33.2	57.0	43.0
Other	80.1	19.9	78.3	21.7
Total	66.2	33.4	72.7	27.3

Source: Westat, Inc./NSF, 1976 *National Survey of Recent Science and Engineering Graduates* and U. S. Bureau of Census/NSF, 1976 *National Survey of Natural and Social Scientists and Engineers*.

Table 16. Percentage Female,
Energy-Related New Entrants Versus Energy-Related Experienced Workers

	<u>New Entrants</u>	<u>Experienced</u>
Major		
Science and Engineering	8.3%	0.9%
Engineering	3.1	.2
Science	19.5	3.5
Occupation		
Scientists and Engineers	6.7%	1.0%
Engineers	3.7	.2
Scientists	18.3	4.3

Source: Westat, Inc./NSF, 1976 *National Survey of Recent Science and Engineering Graduates*, and U. S. Bureau of Census/NSF, 1976 *National Survey of Natural and Social Scientists and Engineers*.

Table 17. Percentage Nonwhite,
Energy-Related New Entrants Versus Energy-Related Experienced Workers

	<u>New Entrants</u>	<u>Experienced</u>
Major		
Science and Engineering	2.4%	2.9%
Engineering	3.1	3.1
Science	1.0	2.3
Occupation		
Scientists and Engineers	2.2%	3.3%
Engineers	2.3	3.3
Scientists	1.7	3.3

Source: Westat, Inc./NSF, *1976 National Survey of Recent Science and Engineering Graduates*, and U. S. Bureau of Census/NSF, *1976 National Survey of Natural and Social Scientists and Engineers*.

Table 18. Type of Employer by Occupation,
Energy-Related New Entrants Versus Energy-Related Experienced Workers

Type of Employer	All Scientists and Engineers		Engineers		Scientists	
	New Entrants	Experienced	New Entrants	Experienced	New Entrants	Experienced
Educational Institution	10.3%	2.4%	7.4%	2.4%	21.4%	2.6%
Nonprofit Organization	2.2	1.8	1.5	1.6	4.7	2.4
Federal Government	5.7	6.3	5.6	5.8	6.5	8.2
State and Local Government	2.1	2.6	2.1	2.5	1.9	3.1
Private Industry	78.1	80.2	81.4	82.2	65.6	71.5
Other	1.6	6.7	2.0	5.4	0	12.3

Source: Westat, Inc./NSF, 1976 National Survey of Recent Science and Engineering Graduates, and U. S. Bureau of Census/NSF, 1976 National Survey of Natural and Social Scientists and Engineers.

Table 19. Primary Work Activity by Occupation,
Energy-Related New Entrants Versus Energy-Related Experienced Workers

Primary Work Activity	All Scientists and Engineers		Engineers		Scientists	
	New Entrants	Experienced	New Entrants	Experienced	New Entrants	Experienced
Management or Administration	8.8%	26.3%	9.2%	27.6%	7.4%	20.6%
Basic Research	6.6	1.1	4.9	.4	13.6	4.5
Applied Research	14.1	5.4	11.6	3.1	23.4	15.2
Development	10.9	10.8	10.3	10.7	13.2	11.1
Design	19.8	15.6	24.6	18.8	.8	1.6
Teachnig	1.1	.7	.4	.6	4.1	1.1
Report and Technical Writing	1.6	3.0	.8	2.6	4.6	4.7
Production, Operations	12.1	11.4	13.9	12.8	5.2	5.1
Consulting	5.8	8.8	6.2	8.3	4.6	10.9
Quality Control	6.8	3.7	6.2	3.5	9.0	4.7
Sales, Distribution	1.9	2.9	2.0	3.4	1.5	.4
Other	10.6	10.4	10.0	8.2	12.7	19.9

Source: Westat, Inc./NSF, 1976 National Survey of Recent Science and Engineering Graduates, and U. S. Bureau of Census/NSF, 1976 National Survey of Natural and Social Scientists and Engineers.

Table 20. Median Salary by Occupation,
New Entrants Versus Experienced Workers

<u>Occupation</u>	<u>New Entrants</u>	<u>Experienced</u>
All Scientists and Engineers	\$11,000	\$22,200
Energy-Related	15,000	24,000
	<u>Ratio of Median Salaries, Energy-Related to Total</u>	
Engineer	1.06	1.06
Chemical	1.04	1.10
Civil	1.16	1.07
Electrical or Electronic	1.06	1.01
Mechanical	1.03	1.00
Other	1.04	1.07
Scientist	1.18	1.20
Physical	.94	1.08
Environmental	1.18	1.08
Other	1.17	1.17
Other	1.08	1.15

Source: Westat, Inc./NSF, 1976 *National Survey of Recent Science and Engineering Graduates*, and U. S. Bureau of Census/NSF, 1976 *National Survey of Natural and Social Scientists and Engineers*.

APPENDIX A - QUESTIONNAIRE: Westat, Inc./NSF, 1976 National
Survey of Recent Science and Engineering Graduates

NATIONAL SCIENCE FOUNDATION

WASHINGTON, D.C. 20550

Dear Graduate:

We need your help in a major national study of the occupational experiences of recent college graduates in Science and Engineering. This project, sponsored by the National Science Foundation will obtain information from a scientifically chosen sample of 16,000 persons who earned Bachelor's or Master's degrees between July 1, 1973 and June 30, 1975. You are one of those chosen to be in this study.

The purpose of this study is to compile national statistics which will allow an appraisal of the employment and educational characteristics of scientists and engineers graduating since 1973. The resulting information will permit the Federal Government, universities and others to formulate science policies and programs and to make evaluations with regard to the science and engineering manpower potential of the nation.

The questionnaire on the following pages will take about 10-15 minutes of your time to complete, and a postage-paid envelope addressed to Westat, Inc. is enclosed for its return. Westat, Inc. has been selected by the National Science Foundation to assist in carrying out this survey.

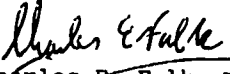
We wish you to know that your completed questionnaire will be seen only by the immediate research staff and will be used for statistical purposes only. In compliance with the Privacy Act of 1974, no personally identifying information will be released to anyone.

We think you will find it interesting and invite your comments on the questionnaire items. In addition, if you have any questions on the survey or need any assistance in completing the questionnaire, please call (collect) Mr. Mark Waksberg or Mr. George K. Schueller at (301) 881-5310.

It would be of great help if you would complete and return the questionnaire within the next five days. If possible, we suggest that you do it now, while you have it in hand. We believe the importance of the study will justify the time you give to it.

The National Science Foundation would greatly appreciate your cooperation in this survey.

Very truly yours,


Charles E. Falk, Director
Division of Science Resources Studies

This information is solicited under the authority of the National Science Foundation Act of 1950, as amended. All information you provide will be treated as confidential and will be used for statistical purposes only. Information will be released only in the form of statistical summaries from which it will be impossible to identify information about any particular person. Your response is entirely voluntary and your failure to provide some or all of the requested information will in no way adversely affect you.

1976 NATIONAL SURVEY OF RECENT SCIENCE AND ENGINEERING GRADUATES
NATIONAL SCIENCE FOUNDATION

DEGREE AND EMPLOYMENT SPECIALTY LIST

Use this list for Questions 5 and 9. Find the number corresponding to the appropriate major field and mark it in the space provided in the questionnaire.

BIOLOGICAL SCIENCE

- 01 Agriculture, all fields
- 02 Anatomy and histology
- 03 Bacteriology
- 04 Biochemistry
- 05 Biology (general)
- 06 Biophysics
- 07 Botany, horticulture, plant pathology
- 08 Entomology
- 09 Forestry, all kinds
- 10 Genetics
- 11 Immunology
- 12 Marine/animal or life science
- 13 Microbiology
- 14 Physiology
- 15 Zoology
- 16 Other biological science

ENGINEERING

- 17 Aeronautical, aerospace, astronautical
- 18 Agricultural
- 19 Architectural
- 20 Chemical
- 21 Civil
- 22 Electrical or electronic
- 23 Environmental, sanitary
- 24 General
- 25 Industrial
- 26 Mechanical
- 27 Metallurgical, material
- 28 Mining, geol., petro.
- 29 Nuclear
- 30 Operations research, systems
- 31 Technology
- 32 Other engineering

PHYSICAL SCIENCE MATHEMATICS

- 33 Astronomy
- 34 Atmospheric science (meteorology)
- 35 Chemistry
- 36 Computer science and data processing
- 37 Earth science (geology, geophysics)
- 38 Geography
- 39 Mathematics
- 40 Oceanography
- 41 Physics
- 42 Statistics
- 43 Other physical sciences

SOCIAL SCIENCE

- 44 Anthropology
- 45 Economics, all fields
- 46 Linguistics
- 47 Political science (incl. government, international relations)
- 48 Public administration
- 49 Psychology (all fields except clinical)
- 50 Social work, all fields
- 51 Sociology
- 52 Other social science

ARTS AND HUMANITIES

- 53 Art, fine and applied
- 54 English (language and literature)
- 55 Foreign language and literature
- 56 History
- 57 Journalism, all fields
- 58 Music, all fields
- 59 Philosophy, all fields

BUSINESS

- 60 Accounting
- 61 Business Administration (general)
- 62 Finance
- 63 Marketing and sales
- 64 Management, all fields
- 65 Secretarial studies
- 66 Other business

EDUCATION

- 67 Art or music
- 68 Biological sciences
- 69 Business
- 70 Elementary
- 71 Mathematics
- 72 Physical education or recreation
- 73 Physical sciences
- 74 Secondary
- 75 Science education, other
- 76 Special education
- 77 Other education

PROFESSIONS, TECHNICAL FIELDS

- 78 Architecture or urban planning
- 79 Clinical psychology
- 80 Dentistry
- 81 Drafting or design, all fields
- 82 Home economics
- 83 Health technology (med., dental or lab.)
- 84 Law or pre-law
- 85 Library or archival science
- 86 Medicine or pre-medicine
- 87 Nursing
- 88 Pharmacy
- 89 Religion
- 90 Other health professions
- 91 Other

OTHER

- 92 Building trades
- 93 Communications (radio, T.V.)
- 94 Crafts (skilled), all fields
- 95 Law enforcement
- 96 Machine operation
- 97 Military science
- 98 Other, not elsewhere classified
- 99 Undecided

1976 SURVEY OF RECENT SCIENCE AND ENGINEERING GRADUATES
NATIONAL SCIENCE FOUNDATION

1. Date of Birth 2. Citizenship 3. Sex

Mo. Day Year

USA . . . 1 ☐
Non-USA . . . 2 ☐
(Specify country)

Male ☐
Female ☐

7. Which category below best describes the type of organization of your principal employment? (CHECK ONLY ONE CATEGORY.)

Business or industry 1 ☐
Junior college, 2-year college, technical institute 2 ☐
Medical school 3 ☐
Four-year college or university other than medical school 4 ☐
Elementary or secondary school system 5 ☐
Hospital or clinic 6 ☐
U.S. military service, active duty, or Commissioned Corps, e.g., UPMS, NOAA 7 ☐
U.S. government, civilian employee 8 ☐
State government 9 ☐
Local or other government 10 ☐
(Specify):
International agency 11 ☐
Non-profit organization, other than hospital, clinic or educational institution 12 ☐
Other (Specify): 88 ☐

4. Race/Ethnic Identification:

White/Caucasian . . . 1 ☐
Black/Negro/or Afro-American . . . 2 ☐
American-Indian . . . 3 ☐
Mexican-American/Chicano . . . 4 ☐
Puerto Rican/American 5 ☐
Oriental 6 ☐
Other Asian 7 ☐
Other (Specify) 8 ☐

5. List in the table below all undergraduate and graduate degrees, excluding honorary degrees, than have been awarded to you. Please use Specialty List on Page 2 for major field and number.

Type of Degree	Granted		Major Field (Use Specialties List)	
	Month	Year	Name	Number
Bachelor's				
Masters				
Doctorate				

PLEASE NOTE that in items 6-14a, information is requested for the current year as of the week of June 7, 1976

6. What was your employment status as of the period indicated? (CHECK ONLY ONE CATEGORY.)

Employed full-time, science or engineering related positions . . . 1 ☐ Go to 7
Employed full-time, nonscience or nonengineering related position . . . 2 ☐ Go to 6a
Employed part-time, science or engineering related position . . . 3 ☐ Go to 6b
Employed part-time, nonscience or nonengineering related position . . . 4 ☐ Go to 6b
Postdoctoral appointment (fellowship, traineeship, research associateship, etc.) 5 ☐ Go to 7
Unemployed and seeking employment . . . 6 ☐ Go to 15
Unemployed and not seeking employment 7 ☐ Go to 15
Retired and not employed 8 ☐ Go to 15
Other (Specify): 9 ☐ Go to 15

6a. If you were employed full-time during the week of June 7, 1976, in a position unrelated to science or engineering, what was the MOST important reason for taking the position?

Prefer nonscience or nonengineering position 1 ☐
Promoted out of science or engineering position 2 ☐
Pay is better 3 ☐
Locational preference 4 ☐
Science or engineering position not available 5 ☐
Other (Specify): 6 ☐

Go to Q. 7

6b. If you were employed part-time during the week of June 7, 1976, were you seeking full-time employment?

Yes . . . 1 ☐ No . . . 2 ☐

A-4

8. What was the primary (A) and secondary (B) work activity related to your position? (CHECK ONLY ONE BOX IN EACH COLUMN.)

	A	B
Management or administration of:		
Research and development	1 <input type="checkbox"/>	
Other than research & development	2 <input type="checkbox"/>	
Both	3 <input type="checkbox"/>	
Basic research	4 <input type="checkbox"/>	
Applied research	5 <input type="checkbox"/>	
Development of equipment, products, systems data	6 <input type="checkbox"/>	
Design	7 <input type="checkbox"/>	
Teaching	8 <input type="checkbox"/>	
Report or other technical writing, editing	9 <input type="checkbox"/>	
Production	10 <input type="checkbox"/>	
Consulting (Specify):	11 <input type="checkbox"/>	
Professional services to individuals	12 <input type="checkbox"/>	
Quality control, inspection, testing	13 <input type="checkbox"/>	
Sales, marketing, purchasing, estimating	14 <input type="checkbox"/>	
Other (Specify):	15 <input type="checkbox"/>	

9. From the Degree and Employment Specialties List on Page 2, select and enter both the number and title of the specialty most closely related to your principal employment. Write in your specialty if it is not on the list.

Number Type of Specialty

10. What percent of time did you devote to each of the following activities?

Percent

Management or administration of:

Research and development

Other than research and development

Basic research

Applied research

Development

Design

Teaching

Consulting

Production

Other (Specify):

TOTAL 100%

11. Please give the name of your principal employer (organization, company, etc., or, if self-employed write "self"), and actual place of employment.

Name of Employer

City State Zip Code

12. What was the basic annual salary* associated with your principal professional employment during the week of June 7, 1976 ?

\$ _____ per year.

*NOTE: Basic annual salary is your annual salary before deductions for income tax, social security, retirement, etc., but does not include bonuses, overtime, summer teaching, or other payment for professional work.

If academically employed:

- a. Check whether salary was for 9-10 months ☐
or 11-12 months ☐.

- b. What was the title of your position?

Professor 1 ☐
Associate Professor 2 ☐
Assistant Professor 3 ☐
Instructor 4 ☐
Lecturer 5 ☐
Teaching Assistant 6 ☐
Research Assistant 7 ☐
Other (Specify): 8 ☐

Does not apply. 9 ☐

13. Listed below are selected topics of critical national interest. If you devoted a significant proportion of your professional time to any of these problem areas in the week of June 7, 1976, please check the box for the one on which you spent the MOST time.

Education:
Teaching 1 ☐
Other 2 ☐
Health 3 ☐
Defense 4 ☐
Environmental protection, pollution control 5 ☐
Space 6 ☐
Crime prevention and control 7 ☐
Food production and technology 8 ☐
Energy and fuel 9 ☐
Other mineral resources 10 ☐
Community development and services 11 ☐
Housing (planning, design, construction). 12 ☐
Transportation 13 ☐
Other (Specify): 14 ☐
None of the above 14 ☐

14. Was any of your work in the week of June 7, 1976 supported by U.S. Government funds?

Yes. 1 ☐ Go to 14a
No 2 ☐ Go to 15
Don't Know 3 ☐

- 14a. If yes, which of the following Federal agencies or departments were supporting the work? (CHECK ALL THAT APPLY.)

NASA 31 ☐
National Science Foundation 32 ☐
Environmental Protection Agency 33 ☐
Energy Research and Development Administration (AEC) 34 ☐
Nuclear Regulatory Commission 35 ☐
Agency for International Development 36 ☐
Department of Interior 37 ☐
National Institutes of Health, HEW 38 ☐
Alcohol, Drug Abuse and Mental Health Administration, HEW 39 ☐
Office of Education, HEW 40 ☐
Other HEW, (Specify): 41 ☐

Department of Defense 42 ☐
Department of Commerce 43 ☐
Department of Agriculture 44 ☐
Department of Transportation 45 ☐
Department of Justice 46 ☐
Department of Housing and Urban Development 47 ☐
Other agency or department (Specify): 48 ☐

Don't know source agency 49 ☐

15. How many years of professional work experience, including teaching, have you had? (Professional experience includes those work activities in which you have been engaged requiring knowledge of your field at the baccalaureate or equivalent background.)

Years

16. Which of the following best describes your current enrollment status? (MARK ONE ONLY.)

Not a student 1 ☐
Graduate student (post baccalaureate):
Full-time 2 ☐
Part-time 3 ☐

THANK YOU FOR YOUR COOPERATION. PLEASE RETURN THE COMPLETED QUESTIONNAIRE IN THE ENCLOSED STAGE PAID ENVELOPE.

APPENDIX B - TECHNICAL NOTES

SAMPLE SIZE

Tables 21 and 22 provide sampling information. Table 21 presents the actual sample size of the energy-related new entrants by major field of study and highest degree held.

Table 22 provides the percentage energy-related for the new entrants by major field of study and highest degree held. For each percentage, the standard error of the estimate that will yield a 95% confidence interval has been calculated.

Table 21. Sample Size of Energy-Related New Entrants

<u>Major</u>	<u>Total</u>	<u>Bachelor's</u>	<u>Master's</u>
Engineering	240 ^a	174	65
Chemical	27	18	9
Civil	38	25	13
Electrical or Electronic	48	36	12
Mechanical	59	49	10
Other	68 ^a	46	21
Science	143	109	34
Physical	30	24	6
Environmental	40	26	14
Other	73	59	14
Other	1	0	1
TOTAL	384 ^a	283	100

^aIncludes one respondent who holds a doctorate degree.

Table 22. 95% Confidence Intervals for Percentage Energy-Related of New Entrants

<u>Major</u>	<u>Total</u>	<u>Bachelor's</u>	<u>Master's</u>
Engineering	0.175 (±.048)	0.168 (±.055)	0.193 (±.095)
Chemical	.232 (±.158)	.196 (±.182)	.385 (±.316)
Civil	.166 (±.118)	.149 (±.139)	.199 (±.216)
Electrical or Electronic	.143 (±.099)	.141 (±.113)	.152 (±.203)
Mechanical	.245 (±.109)	.243 (±.119)	.272 (±.275)
Other	.155 (±.086)	.145 (±.101)	.166 (±.158)
Science	.018 (±.022)	.014 (±.022)	.036 (±.063)
Physical	.043 (±.072)	.036 (±.074)	.065 (±.196)
Environmental	.168 (±.115)	.125 (±.125)	.269 (±.230)
Other	.013 (±.026)	.011 (±.026)	.024 (±.080)
Other	.004 (±.122)	--	.044 (±.128)
Total	.046 (±.021)	.039 (±.022)	.075 (±.051)

FIELD CATEGORY DEFINITIONS

The fields listed for college major and occupation have been aggregated and matched among the lists provided with the two surveys. Table 23 gives the number codes used to define the indicated field on the three lists (in Appendixes A and C).

Table 23. Field Category Definitions

<u>Field</u>	<u>1976 National Survey of Recent Science and Engineering Graduates</u>	<u>1976 National Survey of Natural and Social Scientists and Engineers</u>	
	<u>Degree and Employment Specialty List</u>	<u>Major Field of Study</u>	<u>Occupation</u>
Engineer			
Chemical	20	535	403
Civil	21	536	404
Electrical or Electronic	22	537	405
Mechanical	26	543	407
Other	17-19, 23-25, 27-32	532-534, 538-542, 544-550	401, 402, 406, 408-413
Scientist			
Physical	33, 35, 38, 41, 43	560, 561, 564, 565, 568, 593	422, 424, 427
Environmental	34, 37, 40	563, 566, 567	423, 425, 426
Other	1-16, 36, 39, 42 44-49, 51, 52, 78 79, 86, 90	500-526, 551, 553, 556-559, 569-577, 580-587	414-421, 428- 441

APPENDIX C - QUESTIONNAIRE: U. S. Bureau of Census/NSF,
1976 National Survey of Natural and Social Scientists and Engineers

FORM PMS-26A
(10-29-78)U.S. DEPARTMENT OF COMMERCE
BUREAU OF THE CENSUS1976 NATIONAL SURVEY OF
NATURAL AND SOCIAL SCIENTISTS AND ENGINEERS

NOTICE - Your report to the Census Bureau is confidential. It may be seen only by sworn Census employees and may be used only for statistical purposes.

Please read instructions carefully before answering questions.

Answer as accurately as you can by printing your reply clearly or by entering an "X" in the box next to the appropriate reply.

When the instructions for a question direct you to enter a code and description from a list, please refer to the reference list attached to this questionnaire.

A. Is the information shown in the mailing label above correct?

☐ YES

☐ NO - Please enter the correct information

Name

Number and street

City or town State (if USA) ZIP code

Foreign country

B. Is this mailing address the same address as your place of residence?

☐ SAME

☐ DIFFERENT - Please enter your city and State or foreign country of residence.

City or town

State (if USA)

ZIP code

Foreign country

Dear Friend:

Thank you for your continued cooperation in the National Sample of Scientists and Engineers, a series of biennial surveys sponsored by the National Science Foundation and conducted by the Bureau of the Census. From this series, a comprehensive picture of the development and utilization of America's scientists and engineers is being obtained. And, since the surveys include a sample of persons from various other fields, in addition to science and engineering, a valuable measure of the employment and skills among the highly educated population in general has been gained. Statistical data from these surveys are used for planning and analysis by Federal and State manpower agencies, private businesses, nonprofit research organizations, industrial and trade associations, and universities. Your cooperation, of course, has been an essential element in the success of this program.

To extend the value of past surveys, the National Science Foundation has asked the Bureau to survey this sample of persons once again to collect current employment information and related data. This is the most reliable and least costly way to learn, for example, how the employment of highly trained persons is affected by fluctuations in the economy. For the survey to be successful and yield truly representative information, it is important that each person fill out and return the questionnaire.

Please complete the questions which follow on pages 2 through 4 and return your questionnaire in the enclosed preaddressed envelope. For some questions you are instructed to enter a code and description from Reference List A, B, or C. These lists are attached to the questionnaire.

This information is being collected under the authority of the National Science Foundation Act of 1950, as amended. The information you provide is confidential and may be seen only by sworn employees of the Bureau of the Census. The information cannot be used for anything but statistical purposes and cannot be given to any other Government agency, private concern, or individual. The data will be released only in the form of statistical summaries from which it will be impossible to identify information about any particular person. Your response is entirely voluntary and your failure to provide some or all of the requested information will in no way adversely affect you.

Thank you for your cooperation.

Sincerely,

Vincent P. Barabba

VINCENT P. BARABBA
Director
Bureau of the Census

Enclosure

PART I - EDUCATION AND TRAINING

1. EDUCATION FROM 1972 TO THE PRESENT

a. Since January 1972 have you attended any college, university, or other post high school institution?
☐ 013 Yes - Continue with 1b ☐ 2 No - Skip to question 2

b. List below each institution from which you have obtained (since January 1972) or are currently obtaining formal training beyond the high school level, and give the other information requested. Begin with the most recent and work back through January 1972. Use a separate row for each degree granted or worked for. Designate degrees by abbreviation (e.g., A.A., B.A., M.A., Ph.D., LL.B., M.D., etc.).

	College, university, or other post high school institution (Enter Name and State or foreign country)	Type of degree worked for, if any (Enter Ph.D., M.A., B.A., A.A., etc. or mark "None" box)	Major field of study (Enter code and description from Reference List A)	Year degree was awarded or will be awarded. (Enter year or mark "None" box)
MOST RECENT	013 [] [] [] [] Name _____ State or foreign country _____	014 [] [] [] [] OR <input type="checkbox"/> None	015 [] [] [] [] ← Code Description _____	016 [] [] [] [] 19 _____ OR <input type="checkbox"/> None
	017 [] [] [] [] Name _____ State or foreign country _____	018 [] [] [] [] OR <input type="checkbox"/> None	019 [] [] [] [] ← Code Description _____	020 [] [] [] [] 19 _____ OR <input type="checkbox"/> None
2ND TO LAST	021 [] [] [] [] Name _____ State or foreign country _____	022 [] [] [] [] OR <input type="checkbox"/> None	023 [] [] [] [] ← Code Description _____	024 [] [] [] [] 19 _____ OR <input type="checkbox"/> None

2. OTHER TRAINING RECEIVED IN 1974 OR 1975

Aside from formal education, which of the following types of training did you receive in 1974 or 1975?

Mark the appropriate year for each type of training you have received.

- On-the-job training
- Military training applicable to civilian occupations
- Extension or correspondence courses
- Courses at employer's training facility
- Courses at adult education center
- Other training
- None

	025 1974	026 1975
1	<input type="checkbox"/>	<input type="checkbox"/>
2	<input type="checkbox"/>	<input type="checkbox"/>
3	<input type="checkbox"/>	<input type="checkbox"/>
4	<input type="checkbox"/>	<input type="checkbox"/>
5	<input type="checkbox"/>	<input type="checkbox"/>
6	<input type="checkbox"/>	<input type="checkbox"/>
7	<input type="checkbox"/>	<input type="checkbox"/>

PART II - EMPLOYMENT STATUS

PLEASE NOTE that in items 3a-5 information is requested for both the current year, as of the week of February 8-14, 1976, and last year, as of the week of February 9-15, 1975. Please answer applicable questions in column (A), then in column (B).

	Week of February 8-14, 1976 (A)	Week of February 9-15, 1975 (B)
3a. What was your employment status as of the week indicated?	027 <input type="checkbox"/> 1 Employed full time - Skip to 4a <input type="checkbox"/> 2 Employed part time - Answer 3b <input type="checkbox"/> 3 On post doctoral appointment (fellowship, traineeship, research associate, etc.) - Skip to 4a <input type="checkbox"/> 4 Unemployed and seeking work - Go to Column (B) <input type="checkbox"/> 5 Not employed and not seeking work - Skip to 5	028 <input type="checkbox"/> 1 Employed full time - Skip to 4a <input type="checkbox"/> 2 Employed part time - Answer 3b <input type="checkbox"/> 3 On post doctoral appointment (fellowship, traineeship, research associate, etc.) - Skip to 4a <input type="checkbox"/> 4 Unemployed and seeking work - Go to Part III <input type="checkbox"/> 5 Not employed and not seeking work - Skip to 5
b. If you worked part time, were you seeking full-time work?	029 <input type="checkbox"/> 1 Yes <input type="checkbox"/> 2 No } Continue with 4a	030 <input type="checkbox"/> 1 Yes <input type="checkbox"/> 2 No } Continue with 4a
4a. Were you working in a position related to science or engineering?	031 <input type="checkbox"/> 1 Yes - Go to top of column (B) <input type="checkbox"/> 2 No - Answer 4b	032 <input type="checkbox"/> 1 Yes - Go to Part III <input type="checkbox"/> 2 No - Answer 4b
b. What was the most important reason for taking this position?	033 MARK ONLY ONE BOX <input type="checkbox"/> 1 Preferred nonscience or nonengineering position <input type="checkbox"/> 2 Promoted out of science or engineering position <input type="checkbox"/> 3 Pay was better in nonscience or nonengineering position <input type="checkbox"/> 4 Locational preference <input type="checkbox"/> 5 Science or engineering position not available <input type="checkbox"/> 6 Other - Specify _____ (Go to top of column B)	034 MARK ONLY ONE BOX <input type="checkbox"/> 1 Preferred nonscience or nonengineering position <input type="checkbox"/> 2 Promoted out of science or engineering position <input type="checkbox"/> 3 Pay was better in nonscience or nonengineering position <input type="checkbox"/> 4 Locational preference <input type="checkbox"/> 5 Science or engineering position not available <input type="checkbox"/> 6 Other - Specify _____ (Go to Part III)
5. If you were not employed and not seeking work, were you principally	035 MARK ONLY ONE BOX <input type="checkbox"/> 1 Retired <input type="checkbox"/> 2 Other - Specify _____ (Go to top of column B)	036 MARK ONLY ONE BOX <input type="checkbox"/> 1 Retired <input type="checkbox"/> 2 Other - Specify _____ (Go to Part III)

PART III - JOB ACTIVITIES

INSTRUCTIONS FOR COMPLETING QUESTIONS 6-16b

- Complete column (A) for questions 6-16b for the job held during the week of February 8-14, 1976 or for your most recent prior job held
- Column (B) should be completed only if the job you had during the week of February 9-15, 1975 differed from the job described in column (A). If the job was the same, mark the "YES" box at the top of column (B). NOTE: Consider a change of jobs to have occurred if (1) you changed employers; or (2) you remained with the same employer but there were significant changes in duties, levels of responsibility, or occupation; or (3) you worked at a different institution while on sabbatical leave from a college or university.
- If you held more than one job during the weeks mentioned above, please report only the job at which you worked the greatest number of hours.

	Job held during week of February 8-14, 1976 or most recent prior job (A)	Job held during week of February 9-15, 1975 Was this the same job as entered in column (A)? (B)
6. Where did you work? Write in city and State or foreign country of company, business, agency, or other employer.	038 [] [] [] [] City _____	037 <input type="checkbox"/> 1 Yes - Do not complete column (B) <input type="checkbox"/> 2 No - Complete column (B)
	040 [] [] [] [] State or foreign country _____	039 [] [] [] [] City _____
		041 [] [] [] [] State or foreign country _____

PART III - JOB ACTIVITIES - Continued		
	Job held during week of February 8-14, 1976 or most recent prior job (A)	Job held during week of February 9-15, 1975 (B)
7. What kind of business was this? Enter code and description from Reference List B.	042 <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> ← CODE Description _____	043 <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> ← CODE Description _____
8. What was your occupation? Enter code and description from Reference List C.	044 <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> ← CODE Description _____	045 <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> ← CODE Description _____
9. What work activities were related to this position? Mark all activities in which you spent time.	<div>046</div> <div>1 Management or administration of research and development</div> <div>2 Management or administration of other than research and development</div> <div>3 Teaching and training - preparing and teaching courses, guiding and counseling students or trainees</div> <div>4 Basic research</div> <div>5 Applied research</div> <div>6 Development - product, process, and technical development</div> <div>048</div> <div>7 Report and technical writing, editing, information retrieval</div> <div>8 Clinical diagnosis</div> <div>9 Design - of equipment, processes, models</div> <div>10 Quality control, testing, evaluation, or inspection</div> <div>050</div> <div>11 Operations - production, maintenance, construction, installation</div> <div>12 Distribution - sales, traffic, purchasing, customer and public relations</div> <div>13 Statistical work - survey work, forecasting, statistical analysis</div> <div>052</div> <div>14 Consulting</div> <div>15 Computer applications</div> <div>16 Other activities - Specify <u>7</u></div>	<div>047</div> <div>1 Management or administration of research and development</div> <div>2 Management or administration of other than research and development</div> <div>3 Teaching and training - preparing and teaching courses, guiding and counseling students or trainees</div> <div>4 Basic research</div> <div>5 Applied research</div> <div>6 Development - product, process, and technical development</div> <div>049</div> <div>7 Report and technical writing, editing, information retrieval</div> <div>8 Clinical diagnosis</div> <div>9 Design - of equipment, processes, models</div> <div>10 Quality control, testing, evaluation, or inspection</div> <div>051</div> <div>11 Operations - production, maintenance, construction, installation</div> <div>12 Distribution - sales, traffic, purchasing, customer and public relations</div> <div>13 Statistical work - survey work, forecasting, statistical analysis</div> <div>053</div> <div>14 Consulting</div> <div>15 Computer applications</div> <div>16 Other activities - Specify <u>7</u></div>
10. Among all the activities marked above which was your primary and which was your major secondary activity? Fill in the appropriate code numbers (1 to 16) from question 9.	<div>CODE</div> <div>054 _____ Primary</div> <div>056 _____ Secondary</div>	<div>CODE</div> <div>055 _____ Primary</div> <div>057 _____ Secondary</div>
11. What percent of working time did you devote to each of the following activities? PLEASE NOTE Basic research is study directed toward gaining scientific knowledge primarily for its own sake. Applied research is study directed toward gaining scientific knowledge in an effort to meet a recognized need. Development is direction of the knowledge gained from research toward production of useful materials, devices, systems, and methods. Entries in each column should sum to 100%.	<div>058 _____ % Management or administration of research and development</div> <div>060 _____ % Management or administration of other than research and development</div> <div>062 _____ % Basic research</div> <div>064 _____ % Applied research</div> <div>066 _____ % Development</div> <div>068 _____ % Design</div> <div>070 _____ % Teaching</div> <div>072 _____ % Consulting</div> <div>074 _____ % Other - Specify _____</div> <div>100% TOTAL</div>	<div>059 _____ % Management or administration of research and development</div> <div>061 _____ % Management or administration of other than research and development</div> <div>063 _____ % Basic research</div> <div>065 _____ % Applied research</div> <div>067 _____ % Development</div> <div>069 _____ % Design</div> <div>071 _____ % Teaching</div> <div>073 _____ % Consulting</div> <div>075 _____ % Other - Specify _____</div> <div>100% TOTAL</div>
12. Which category best describes the type of organization of your principal employment or post doctoral appointment?	<div>076 MARK ONLY ONE BOX</div> <div>01 Business or industry</div> <div>02 Junior college, 2-year college, technical institute</div> <div>03 Medical school</div> <div>04 4-year college or university, other than medical school</div> <div>05 Elementary or secondary school system</div> <div>06 Hospital or clinic</div> <div>07 Non-profit organization, other than hospital, clinic, or educational institution</div> <div>08 U.S. military service, active duty, or Commissioned Corps, e.g., USPHS, NOAA</div> <div>09 U.S. Government, civilian employee</div> <div>10 State government</div> <div>11 Local or other government - Specify <u>7</u></div> <div>12 International agency</div> <div>13 Self-employed</div> <div>14 Other - Specify _____</div>	<div>077 MARK ONLY ONE BOX</div> <div>01 Business or industry</div> <div>02 Junior college, 2-year college, technical institute</div> <div>03 Medical school</div> <div>04 4-year college or university, other than medical school</div> <div>05 Elementary or secondary school system</div> <div>06 Hospital or clinic</div> <div>07 Non-profit organization, other than hospital, clinic, or educational institution</div> <div>08 U.S. military service, active duty, or Commissioned Corps, e.g., USPHS, NOAA</div> <div>09 U.S. Government, civilian employee</div> <div>10 State government</div> <div>11 Local or other government - Specify <u>7</u></div> <div>12 International agency</div> <div>13 Self-employed</div> <div>14 Other - Specify _____</div>

PART III - JOB ACTIVITIES - Continued					
		Job held during week of February 8-14, 1976 or most recent prior job		Job held during week of February 9-15, 1975	
		(A)		(B)	
13. Between what dates did you hold this position? <i>Enter month and year</i>		078 From	079 To	DR Present	080 From 081 To
14. What was the basic salary associated with this position? If you were on a post doctoral appointment, include stipend plus allowances. (Basic salary refers to salary before deductions for income tax, social security, retirement, etc. but does not include bonuses, overtime, summer teaching, or other payment for secondary jobs.)		082 \$ _____ .00 084 1. Per year 2. Per month 3. Per week If academically employed, mark whether salary is for - 086 1. 9-10 months 2. 11-12 months		083 \$ _____ .00 085 1. Per year 2. Per month 3. Per week If academically employed, mark whether salary is for - 087 1. 9-10 months 2. 11-12 months	
15. During the previous year (1975 for Column A, 1974 for Column B), what was the basic salary associated with this position?		088 1. Did not hold this job in 1975 - Skip to 16a 090 \$ _____ .00 in 1975 092 1. Per year 2. Per month 3. Per week If academically employed, mark whether salary is for - 094 1. 9-10 months 2. 11-12 months		089 1. Did not hold this job in 1974 - Skip to 16a 091 \$ _____ .00 in 1974 093 1. Per year 2. Per month 3. Per week If academically employed, mark whether salary is for - 095 1. 9-10 months 2. 11-12 months	
16a. Was ANY of your work supported or sponsored by U.S. Government funds?		096 1. Yes - Continue with 16b 2. No - Skip to 17a 3. Don't know		097 1. Yes - Continue with 16b 2. No - Skip to 17a 3. Don't know	
b. Which of the following agencies or departments were supporting the work? <i>Mark as many as apply</i>		098 1. Department of Housing and Urban Development 2. Department of the Interior 3. Department of Labor 4. Department of Defense 5. Department of Commerce 6. Department of Agriculture 100 7. Department of Transportation 8. Department of Justice 9. NIH (National Institutes of Health) 10. Alcohol and Drug Abuse Mental Health Administration 102 11. Office of Education 12. Other H.E.W. - Specify <u> </u> 13. NASA (National Aeronautic and Space Administration) 104 14. NSF (National Science Foundation) 15. EPA (Environmental Protection Agency) 16. ERDA (Energy Research and Development Administration) 106 17. Nuclear Regulatory Commission 18. AID (Agency for International Development) 19. Other agency or department - Specify <u> </u> 108 20. Don't know source agency		099 1. Department of Housing and Urban Development 2. Department of the Interior 3. Department of Labor 4. Department of Defense 5. Department of Commerce 6. Department of Agriculture 101 7. Department of Transportation 8. Department of Justice 9. NIH (National Institutes of Health) 10. Alcohol and Drug Abuse Mental Health Administration 103 11. Office of Education 12. Other H.E.W. - Specify <u> </u> 13. NASA (National Aeronautic and Space Administration) 105 14. NSF (National Science Foundation) 15. EPA (Environmental Protection Agency) 16. ERDA (Energy Research and Development Administration) 107 17. Nuclear Regulatory Commission 18. AID (Agency for International Development) 19. Other agency or department - Specify <u> </u> 109 20. Don't know source agency	

PART IV - OTHER INFORMATION	
17a. At anytime during calendar year 1975 were you without a job AND actively seeking employment?	110 1. Yes - Continue with 17b 2. No - Skip to question 18
b. For how many weeks were you seeking employment?	111 1. 1 to 4 weeks 4. 15 to 26 weeks 2. 5 to 10 weeks 5. 27 weeks or more 3. 11 to 14 weeks
18. How many years of professional experience, including teaching, have you had? <i>Enter number of years</i>	112 _____ Years
19. Based on your total education and experience, what do you regard yourself as professionally? <i>Enter code and description from Reference List C.</i>	113 CODE Description
20. Listed at the right are selected topics of critical national interest. If you devote a significant proportion of your professional time to any of these problem areas, please mark the box for the one on which you spend the MOST time.	114 <div style="text-align: center;">MARK ONLY ONE BOX</div> <div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> 01 Health 02 Education 03 Teaching 04 Other 04 Environment protection, pollution control 05 Space 06 National defense 07 Crime prevention and control </div> <div style="width: 45%;"> 08 Food production and technology 09 Energy and fuel 10 Other mineral resources 11 Community development and services 12 Housing planning, construction 13 Does not apply </div> </div>
21. In the event that it is necessary to contact you to clarify some of the information you provided, may we contact you by telephone? Yes - Enter number(s) on which you can be reached → No	
<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;">Area code Telephone number</div> <div style="width: 45%;">Area code Telephone number</div> </div>	
22. Please enter the name of a person at an address other than yours through whom you can be reached.	
<div style="display: flex; justify-content: space-between;"> <div style="width: 30%;">Name</div> <div style="width: 30%;">Address (Number and Street), City</div> <div style="width: 20%;">State or foreign country</div> <div style="width: 20%;">Zip code</div> </div>	
23. Print your name here	
Date prepared	

REFERENCE LIST A - MAJOR FIELDS OF STUDY

This list is to be used in answering question 1b about the field(s) in which you have obtained study or training. It is divided into two sections: Section I is a list of fields of academic study generally leading to bachelor's or higher degrees. Section II is a list of fields of study and training below those generally leading to a bachelor's degree.

Please scan the entire list, choose the appropriate answer for the question and then enter the code and description in the appropriate section of question 1b. If none of the categories listed below adequately describes what you were studying or being trained in, use the "Other" category (code 600 or 625) and enter a brief description of what you were studying in the space provided on the questionnaire.

Section I - FIELDS OF ACADEMIC STUDY LEADING TO BACHELOR'S OR HIGHER DEGREES

Code	Description	Code	Description
Biological and Agricultural Sciences and Related Fields		Mathematical Sciences	
581	Agriculture, business	557	Mathematics
582	Agriculture, general	558	Statistics and actuarial sciences
583	Agronomy, field crops	559	Computer sciences and systems analysis
584	Anatomy and histology	560	Operations research/management science
585	Animal physiology		
586	Animal science	Physical Sciences	
587	Bacteriology, virology, mycology, parasitology	560	Astronomy
588	Biochemistry	561	Chemistry
589	Biology, general	562	Geography
590	Biophysics	563	Meteorology
591	Botany, general	564	Physics
592	Dairy science (dairy husbandry)	565	Physical sciences, general
593	Entomology	566	Geology and geophysics
594	Fish management	567	Oceanography
595	Fish and game or wildlife management	568	Physical sciences, other fields
596	Food science (food technology and processing, dairy manufacturing and technology, food industry)		
597	Forestry	Psychology	
598	Genetics	569	Clinical
599	Horticulture	570	Educational
600	Immunology	571	General psychology
601	Microbiology	572	Psychology, other fields
602	Plant pathology		
603	Plant physiology	Social Sciences	
604	Soil science (soil management, soil conservation)	573	Anthropology
605	Zoology, general	574	Area studies, regional studies
606	Biological and agricultural sciences, other fields	575	Economics, agricultural
		576	Economics, except agricultural
Education		577	Foreign service programs
527	Biological sciences education	593	Geography
528	Mathematics education	594	History
529	Physical sciences education	595	Industrial relations
530	Trade and industrial training	596	International relations
531	Education, other fields	597	Political science or government
		598	Public administration
Engineering		599	Social sciences, general
532	Aerospace, aeronautical, astronautical, and related fields	600	Social work, social administration, social welfare
533	Agricultural	601	Sociology
534	Architectural	602	Social sciences, other fields
535	Chemical, petroleum refining		
536	Civil, construction, transportation	Arts, Humanities, and Other Specialties	
537	Electrical, electronics	588	Arts, general
538	Engineering sciences, mechanics, physics	589	Business and commerce, including accounting, hotel and restaurant administration, and secretarial studies
539	Engineering technology	590	English and journalism
540	Environmental/sanitary engineering	591	Fine and applied arts, all fields
541	General or unified	592	Foreign language and literature, all fields
542	Industrial	593	Geography
543	Mechanical	594	Home economics, all fields
544	Metallurgical, materials, ceramics	595	Law or prelaw
545	Mining, mineral, geological	596	Library science
546	Naval architecture and marine engineering	597	Military science, including merchant marine deck officer
547	Nuclear	598	Philosophy, all fields
548	Operations research/systems engineering	599	Religion and theology, all fields
549	Petroleum	600	Other (Describe briefly under the applicable item on the questionnaire.)
550	Engineering, other fields		
Health Fields			
551	Medicine or premedicine, and clinical medical sciences		
552	Nursing (4 year or longer program)		
553	Pathology		
554	Pharmacology		
555	Pharmacy		
556	Health professions, other fields (4 year or longer program)		

Section II - FIELDS OF ACADEMIC STUDY AND OCCUPATIONAL TRAINING RELATED TO PROGRAMS BELOW THE BACCALAUREATE

Code	Description	Code	Description
Data Processing-related fields of study or training		Other fields of study or training	
601	Computer programming	616	Business and commerce-related fields of study or training
602	Computer operating	617	Craft (skilled) occupations-related fields of study or training (such as carpentry, bricklaying, tool and die making, etc.)
603	All other data processing fields of study or training	618	Educational-related fields of study or training
Engineering-related fields of study or training		619	Home economics
604	Drafting and design, all fields	620	Nursing and other health service-related fields of study or training
605	Aeronautical technology	621	Operative occupations-related fields of study or training (such as machine operation, driving, inspecting, etc.)
606	Architectural or building technology	622	Police technology or law enforcement
607	Chemical technology	623	Sales and marketing-related fields of study or training
608	Civil technology	624	Service occupations-related fields of study or training (such as cook, beautician, firefighter, etc.)
609	Electrical and electronics technology	625	All other fields of study or training (Describe briefly under the applicable item on the questionnaire.)
610	Industrial technology		
611	Mechanical technology		
612	All other engineering-related fields of study or training		
Science-related fields of study or training			
613	Agriculture		
614	Forestry		
615	Other science-related fields of study or training		

PLEASE DETACH BEFORE RETURNING YOUR COMPLETED QUESTIONNAIRE

REFERENCE LIST B - KINDS OF BUSINESSES

This list is to be used in answering question 7 about the kind(s) of business or industry for which you worked. Please scan the entire list, choose the appropriate answer for the question and enter the code and description from this list. If none of the categories listed below adequately describes the kind of business for which you worked, use the "Other" category (code 731).

Code	Description	Code	Description
Manufacturing		Other Kinds of Business	
701	Aircraft, aircraft engines, aircraft parts	720	Agriculture, forestry, and fisheries
702	Chemicals and allied products	721	Business, personal, and professional services
703	Electrical machinery, equipment and supplies for the generation, storage, transformation, transmission, and utilization of electrical energy	722	Construction
704	Electronic apparatus, radio, television and communication equipment and parts	723	Engineering or architectural services
705	Electronic computers, accounting, calculating and office machinery and equipment	724	Finance, insurance, or real estate
706	Fabricated metal products (except ordnance, machinery and transportation equipment)	725	Mining and petroleum extraction
707	Machinery (except electrical) including engines and turbines, farming and construction machinery, mining, metalworking and other manufacturing and service industry machines	726	Private, nonprofit organizations other than educational institutions and hospitals
708	Motor vehicles and motor vehicle equipment including trucks, buses, automobiles, railroad engines and cars	727	Professional and technical societies
709	Ordnance, including manufacture of arms, ammunition, tanks, and complete guided missiles, space vehicles and equipment	728	Research institutions
710	Petroleum refining and related industries	729	Retail and wholesale trade
711	Primary metal industries, including smelting, refining, rolling, drawing, alloying, and manufacture of castings, forgings and other basic metal products	730	Transportation, communication, or other public utilities
712	Professional and scientific equipment and supplies	731	Other (Describe briefly under the applicable item on the questionnaire.)
713	Other manufacturing including printing and publishing		
Educational Institutions		Public Administration (Include only uniquely governmental activities, such as the U.S. Postal Service, U.S. Air Force, State court, Department of Motor Vehicles, city building inspection, or city public welfare. For example, if you work for the U.S. Postal Service use code 733, Federal public administration; on the other hand, if you work at a Veterans' Administration Hospital, use code 718, Hospital or clinic; if you work at a State university, use code 714, College or university; if you work for a county road building agency, use code 722, Construction; if you work in a Defense Department research laboratory, use code 728, Research institution.)	
714	College or university (offering at least a bachelor's degree)	732	Uniformed military service
715	Junior college or technical institute	733	Federal public administration
716	Medical school	734	State public administration
717	Other educational institutions	735	Local public administration (city, county, etc.)
Health Services		737	Regional government
718	Hospital or clinic	736	Other government
719	Other medical and health services		

REFERENCE LIST C - OCCUPATIONS

This list is to be used in answering questions 8 and 19 about your occupational classification. Please scan the entire list, choose the appropriate entry and enter the code and description from this list. If you cannot find exactly the right entry, please choose the one that comes nearest to it. If none of the entries is at all appropriate, use the "Other" category (code 475) and enter a brief description in the space provided on the questionnaire.

Code	Description	Code	Description
Engineers, including college professors and instructors		Health Occupations, including persons who are primarily practitioners. Persons engaged primarily in medical research, teaching, and similar activities use code 432, Medical scientist.	
401	Engineer, aeronautical and astronautical	438	Physician or surgeon
402	Engineer, agricultural	439	Technician, dental
403	Engineer, chemical	440	Technician, medical
404	Engineer, civil and architectural	441	Other health occupation (Describe briefly under the applicable item on the questionnaire.)
405	Engineer, electrical and electronic	Technicians and Technologists, except medical	
406	Engineer, industrial	442	Designer, electronic parts and machine tools
407	Engineer, mechanical	443	Designer, industrial
408	Engineer, metallurgical and materials	444	Designer, other
409	Engineer, mining, petroleum, and geological	445	Draftsman
410	Engineer, nuclear	446	Surveyor
411	Engineer, environmental and sanitary	447	Technician, biological and agricultural
412	Engineer, operations research systems	448	Technician, electrical and electronic
413	Engineer, other fields (Describe briefly under the applicable item on the questionnaire.)	449	Technician, construction, highways, and architectural
Computer Specialist, including college professors and instructors		450	Technician, mechanical
414	Computer programmer	451	Technician, other engineering
415	Computer systems analyst	452	Technician, physical science
416	Computer scientist	453	Technician, other fields (Describe briefly under the applicable item on the questionnaire.)
417	Other computer specialist (Describe briefly under the applicable item on the questionnaire.)	Teachers	
Mathematicians and Statisticians, including college professors and instructors		454	Teacher, elementary school
418	Actuary	455	Teacher, secondary school
419	Mathematician	456	Teacher, college and university, excluding engineering and science (Engineering and science teachers use codes 401-437 above.)
420	Statistician	Administrators, Managers, and Officials, excluding farm	
421	Operations research analyst	476	Urban and regional planner
Physical Scientists, including college professors and instructors		457	College president or dean
422	Chemist	458	Administrator or manager, scientific and technical research and development
423	Earth scientists including geologists, geophysicists, etc.	459	Administrator or manager, production and operations
424	Physicist, astronomer	460	Administrator, manager, or official, all other, excluding self-employed
425	Atmospheric scientist, meteorologist	461	Self-employed proprietor
426	Oceanographer	All Other Occupations	
427	Other physical scientist (Describe)	462	Accountant
Biological Scientists, including college professors and instructors		463	Attorney or judge
428	Agricultural scientists, including foresters and conservationists	464	Sales worker
429	Biological scientist	465	Clerical worker (such as bookkeeper, secretary, etc.)
430	Biochemist	466	Clergy
431	Biophysicist	467	Craft worker (such as baker, carpenter, electrician, mechanic, repair worker)
432	Medical scientist, excluding persons who are primarily medical practitioners; see Health Occupations	468	Farmer (owner, manager, tenant, or farm laborer)
433	Other biological scientist (Describe)	469	Fire fighter or police
Social scientists, including college professors and instructors		470	Laborer, except farm
434	Economist	471	Librarian
435	Psychologist	472	Merchant or shopkeeper, self-employed
436	Sociologist or anthropologist	473	Operative (such as assembler, factory worker, miner, welder, truck driver, etc.)
437	Other social scientist (Describe briefly under the applicable item on the questionnaire.)	474	Postal worker
		475	Other occupations, not specified above (Describe briefly under the applicable item on the questionnaire.)